Yamaha AW4416

Almost an entire studio that can fit on your lap? Derek Johnson and Debbie Poyser lap it up.

The digital 16-track recorder/mixer combo has been a real feature of the last year, as various manufacturers follow Roland's VS1680 lead and produce their own take on this attractive format. The cassette 'Portastudio', as invented by Tascam and elaborated upon by numerous others over the years, never achieved professional status, though many good recordings were doubtless made on such machines. With the digital variety it's a different story. There's absolutely nothing to prevent top quality – even release quality – recordings from being made on the new breed of hard disk 16-trackers.

And, as if to confirm that all-in-one digital units can indeed be taken seriously, Yamaha has entered the digital 16-track ring with the very serious AW4416, which promises to be the big hitter of HD multitrackers. This machine shows few, if any, of the compromises often found on competing units, and though it costs a bit more than the others, Yamaha really don't seem to have skimped on facilities.

Main Features

The AW4416 comprises a comprehensive digital mixer (modelled on Yamaha's professional-quality 0-series desks) with 16 assignable 60mm motorised faders that move under control of a sophisticated automation system, married to a 16-track recorder offering 16- or 24-bit resolution (44.1k/48k). An optional internal CD-RW drive can not only be used for archiving (in addition to SCSI hard drive backup), but can also record Red Book standard stereo masters. The AW even has a dedicated stereo master track for mixing to, so there's no need to attach a mastering recorder if the CD writer is chosen.

Two multieffects processors are built in, as is a simple eight-voice sampler which can run in sync with AW4416 audio. As well as 16 'real' playback tracks there are 112 virtual tracks and a decent range of digital audio editing tools. The large, bright LCD is the focus of operations, but there's a wealth of dedicated buttons too, plus soft knobs alongside the LCD for hands-on pan and EQ control, and a jog/shuttle wheel doubling as a data entry dial. Usefully, you can connect a serial mouse for screen navigation. Proper bar graph metering with selectable peak hold, as well as a clear time counter, is provided by a separate fluorescent display.

The Right Connections?

As standard, the AW offers a similar level of I/O to its competitors. Inputs comprise eight analogue (on balanced jacks), the first two also having XLR connectors with switchable phantom power and insert points, plus stereo S/PDIF digital I/O. Inserts are pretty rare in this market, and Yamaha also offer a dedicated guitar jack on input 8.

On the output front, as well as stereo analogue mix and monitor outs and the aforementioned S/PDIF out, there are four 'Omni' outputs. Like the 01V's similarly-named outputs, these are flexible and allow signals from many points, including the AW's eight internal buses and individual disk tracks, to be routed to the outside world. Though the Omni outs offer advanced users more monitoring and external sub-grouping options, most will probably route four of the eight aux sends to them, to access external effects processors.

So far, so good – but there are further ins and outs to this tale. Where the AW starts to show its pedigree is in the I/O available on optional mini 'YGDAI' (Yamaha General Digital Audio Interface) cards. Eight channels of digital I/O is offered by each of the Alesis ADAT and Tascam TDIF cards, allowing compatible multitracks (and other selected equipment) to be interfaced with the AW. There's also an eight-channel AES/EBU digital I/O card, and extra analogue *inputs* can be added by a card featuring eight balanced jacks. Two further analogue cards are available, utilising XLR connectors, though one

has just four inputs and the other four outputs.

The upshot is that the AW is well served for optional I/O, but it only has two card slots, so decisions will have to be made carefully. And, if extra analogue outputs are required, you might have to buy an ADAT or TDIF card and add a compatible digital-to-analogue converter box, which seems perverse.

Other socketry includes a SCSI connector, Midi In and Out/Thru, a 'To Host' serial port for connecting PCs and older Macs, and a dedicated Midi Time Code output. Speaking of synchronisation, the AW can function as MTC or Midi clock master, or an MTC slave; it's also Midi Machine Control compatible, for remote control of record and playback operation. Wordclock in and out is provided, and the AW can be master or slave in a larger digital studio.

Channel Hopping

Another area where the AW shows its quality is in its mixer. As one would hope from a company with such a reputation in digital mixing, this is both powerful and flexible, offering a potential 44 inputs on mixdown, each with access to dynamics and four-band parametric EQ. When some multitrackers make you use their in-built effects for dynamics processing, the presence of well-specified, editable compression, limiting, gating, companding, expansion or ducking on every channel is luxurious indeed. There's even a user settings library.

Without YGDAI cards installed the mixer has a still-generous 28 channels on mixdown, comprising eight analogue ins, 16 disk track inputs (referred to as the Monitor mixer), and two stereo returns dedicated to the internal effects. As soon as YGDAI cards are fitted, their inputs access up to 16 more mixer channels – a total of 44.

As regards mixer facilities, the AW feels more like a stand-alone pro desk – albeit in 'virtual' format – than the average digital multitracker mixing section. For example, the eight internal buses allow true subgrouping, for easy, flexible track bouncing and internal/external routing options. Eight is also the magic number when it comes to auxiliary sends, and they're individually switchable pre/post fader. Though there are only two dedicated insert points, an internal insert system allows the built-in effects to be applied to any channel, and inputs and outputs can also be set up as insert send/return pairs. Yamaha has made it easy for users' favourite external processors to be incorporated into the signal chain.

The AW's channel dynamics and four-band fully parametric EQ have already been mentioned, but each channel also has phase reversal, attenuation (in addition to the trim pot on the analogue inputs), stereo linking, fader grouping (control up to eight faders by moving one), and mute grouping.

Routing of inputs to mixer channels, mixer channels to internal buses, and internal buses to tracks is via two logical windows where the necessary connections are made by scrolling through assignment options for each input, output or recorder channel. It's not as clear an approach as that taken by Akai's DPS16 (which does the same job with graphical patch leads), but it works well – and there's even a library for user routings.

Auto Magic

One of the pleasures of digital mixing is automation, yet some digital desks and multitrackers skimp in this important area. One unit might offer dynamic automation only when a Midi sequencer is attached to record the data, another might offer a limited number of on-board scenes, perhaps with a way of chaining them. Few competitors boast as comprehensive a system as the AW4416's, which is unique (for a digital multitracker) in its provision of motorised faders.

A combination of scene-based and dynamic automation is available, and an on-board, editable sequencer – 'Automix' – records automation data. In addition to fader moves, EQ, pan, aux send and channel 'on' settings can be recorded in real time. Scenes, of which there are 96 per song, may also be recorded by Automix, as may entries from the EQ, dynamics, effect and channel setup libraries. Mix automation data is recordable in several passes, if necessary, and it's possible to 'punch in' automation moves. Up to 16 Automixes are available for each Song, memory allowing (the 512kB of automation RAM holds about 20,000 events), making alternative mixes feasible.

Scenes may be used independently of Automix, if desired. A Scene captures nearly all the current state of the AW's mixer, including most channel settings plus those for both internal effects processors. Scenes are selected manually or triggered by Midi program changes, and a 'fade time' parameter controls the smoothness of the transition of fader levels between Scenes.

On The Recorder

As mentioned earlier, the AW4416's recorder section can operate at 16- or 24-bit, and using the 24-bit option

All For Effect

The AW4416's dual mono in/stereo out effects processors are functionally identical, and offer a varied collection of presets: seven reverb types, five delays, in mono and stereo; 11 modulation effects (including flanger, chorus, phaser, ring modulation, rotary speaker and mod filter); two dedicated guitar effects (distortion and amp simulation); a trio of 'dynamic' effects (Dyna Filter, Dyna Flange and Dyna Phaser), where input level determines effect response; a three-band parallel filter; plus a dozen combination treatments offering two effects in parallel or serial configurations. Unusually, many of the reverb/modulation serial configurations feed the reverb output into the modulation effect, an often desirable option which isn't always offered by multi-effects units.

Effects are highly editable, with 15 parameters each, and audio quality is excellent. The AW's processors are apparently related to Yamaha's Pro R3 stand-alone effects unit, and this shows especially in their reverb quality. The remaining effects have just the tweakability needed for creative processing, but we were disappointed that delays, and auto pan, can't be sync'd to MIDI clock.

doesn't reduce the number of tracks that can be recorded (though there are limits to how many tracks you can monitor during overdubbing with 24-bit Songs). There's even the facility, unique on such a unit as far as we know, to dither 24-bit recordings to 16-bit during a stereo mix. Yamaha doesn't offer 96k recording, but since there's little evidence, as yet, that many people want or need it, that's no great shortcoming.

Audio is recorded, all 16 tracks at a time if required (and if enough optional I/O is fitted), to an internal EIDE hard drive. The supplied device is a 12GB laptop type which can be swapped for a larger capacity one, but regardless of drive size a maximum 6.4GB of disk space is available per Song – unlikely to be a constraint for most people. The transport locates instantly, as you'd expect, and there are the usual locate, RTZ and marker points (99 of the latter per Song) to ease track navigation – plus the high-quality jog/shuttle wheel can nudge forwards or roll back through a Song at various speeds. As well as footswitch controlled and manual punch-in, there's programmable auto punch which produces the seamless results expected of digital systems. A footswitch can also start and stop Song playback.

A neat Track display with a horizontal bar for each track, resembling computer sequencer piano-roll editors, helps the user keep track of what's been recorded where, as well as supplying Song-specific data such as sample/bit rate, tempo and time signature. Virtual tracks are handled by a dedicated window, where it's the easiest thing imaginable to swap takes-in-waiting back into the main track list. There's considerable freedom of data exchanging, too, between real and virtual tracks, and even between separate Songs on the same drive – something that's beyond many competing units.

Editing options are pretty much as one would expect, and include erase, copy, delete, move, time compression/expansion (50% to 200%) and pitch change (±12 semitones, plus ±50 cents fine control, preserving length). These last two processes can produce exceptional results; even ridiculously large shifts don't sound completely unnatural. In addition, tracks can be named, exchanged, and slipped backwards or forwards in time (by a maximum of five hours either way!). It's also possible to insert silence into a track, trim regions, and divide regions at a user-definable point.

One thing that's under-developed about the AW is its waveform display. It's zoomable and scrollable, but there's no audio scrubbing through it, so it's of little use, especially as you can't access it from the Edit page. Nevertheless, editing is still quite straightforward. The Edit page shows audio as horizontal bars for each track, and sections are highlighted with the help of the scrolling cursor. You can then specify where to copy or move them in terms of absolute time (hours, minutes, seconds, milliseconds), bars and beats, or timecode position. There's no audio feedback, but marker positions previously set in other windows (where audio feedback *is* available) may be recalled in the Edit window, which helps. Still, waveform editing needs some enhancement.

AW Struck?

The ante in the portable digital studio market has now been thoroughly upped by Yamaha. Indeed, the AW4416 takes some beating as a self-contained tool for producing sophisticated, high-quality tracks. Its wealth of features would need more pages than this to explore fully.

It's not absolutely the easiest to use of the portable 16-tracks (we feel that accolade would probably go to Akai's DPS16 or Korg's touchscreen-equipped D16). Although the five function keys and shift keys below the display are helpful, selecting parameters in the LCD does feel long-winded initially, and parameters don't seem to be highlighted conspicuously enough when they *are* selected. We also found the AW sluggish when changing between screens or operation modes, and found the three manuals less than helpful. A bank of pan knobs above the faders would have been welcome, and the headphone and footswitch sockets would be better mounted on the front edge of the unit rather than the back panel.

But it would be unfair to imply that the AW4416 is actually *difficult* to get to grips with – and anyone with experience of Yamaha digital desks will feel right at home. Its clear backlit buttons with integral labelling are pleasant to use (though they could be better grouped on the front panel), and the display is excellent, with largely useful operation windows. There's not even enough noise from the drive or fan to be worth complaining about. Speaking of noise, or the lack of it, the motorised faders are extremely quiet in operation. As for power and facilities, the AW is almost beyond reproach, with only the waveform editor standing out as oddly undeveloped.

In the AW4416, Yamaha have produced what is undoubtedly the most impressive and complete machine of its kind to date, and one that re-writes the rules on what should be offered by a recorder nominally aimed at the project studio market. A world-beater.

Trigger Happy: The Sampler

One of the most unexpected features of the AW4416 is its simple eight-voice sampler, which is fun, if not exactly essential. A maximum of 90 seconds of sampling is available, divisible between 16 sample locations (the eight physical pads are switchable to act as two banks). Samples can be sourced from audio tracks, and options are available for importing WAV files and audio off CD. Editing is limited to naming, erasing and trimming end points – there's no looping facility. Samples are assigned to mixer channels on a pad-to-track basis, and a sample performance can be assembled using a basic pad sequencer, with simple editing. Triggered samples may run in sync with a Song or be recorded to audio tracks.

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ADP25H (HD adaptor plate): $95;
DARA21200012GB HD:$895
CRW8824SNB optional CDR drive: $559